Supplementary Materials

**Corrigendum**

Analyses reported in the section “Verb bias and surprisal” in the published version of the manuscript were based on incorrect values for Prime Verb Surprisal. Correct values for Table 5 are given below. This error did not affect the main conclusion of the section (that there was not effect of Prime Verb Surprisal). In contrast to what is reported in the main text, the effect of priming no longer reached significance when the model included Prime Verb Surprisal and Target Verb Bias values calculated on the basis of DO, PO and Transitive responses (see Table 5 below). The effect of priming was significant when calculated on the basis of the DO and PO responses only (in contrast what is mentioned in footnote 3 of the main text). Furthermore, in the analysis on the Native English data only, the priming effect did not reach significance when Prime Verb Surprisal and Target Verb Bias were included in the model (see Table S5 below).

**Table 5 (Corrigendum)**

*Results from the logistic mixed-effects model on the PO productions as a function of Prime Verb Surprisal and Target Verb Bias for all participants.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| (Intercept) | -0.13 | 0.20 | -0.64 | 0.52 |
| Language | 1.01 | 0.39 | 2.57 | **0.01** |
| Prime | 0.29 | 0.15 | 1.88 | 0.06 |
| Prime Verb Surprisal | -0.09 | 0.08 | -1.17 | 0.24 |
| Target Verb Bias | 2.74 | 0.68 | 4.05 | **0.00** |
| Language: Prime | -0.11 | 0.31 | -0.36 | 0.72 |
| Language: Prime Verb Surprisal | -0.13 | 0.16 | -0.80 | 0.42 |
| Language: Target Verb Bias | 1.55 | 1.29 | 1.20 | 0.23 |
| Prime: Prime Verb Surprisal | -0.24 | 0.16 | -1.44 | 0.15 |
| Prime: Target Verb Bias | 2.13 | 1.31 | 1.63 | 0.10 |
| Language: Prime: Prime Verb Surprisal | -0.33 | 0.33 | -1.01 | 0.31 |
| Language: Prime: Target Verb Bias | -2.16 | 2.59 | -0.83 | 0.40 |

Based on 2015 observations; Loglik = -1027.4. Random effects include by-subject and by-item intercepts, Prime as a by-subject and by-items random slope, and Verb surprisal as by-subject slope.

**Table S1**

*Native English Verb Biases*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | *PO* | *DO* | *Transitive* | *Other* | *DO surprisal1* | *PO surprisal* |
| *Prime verb* | award | 6 | 15 | 2 | 12 | 0.59 | 1.78 |
|  | bring | 20 | 12 | 2 | 1 | 1.43 | 0.74 |
|  | give | 14 | 21 | 0 | 0 | 0.71 | 1.26 |
|  | pass | 30 | 4 | 0 | 1 | 2.81 | 0.18 |
|  | pay | 6 | 16 | 3 | 10 | 0.61 | 1.89 |
|  | sell | 23 | 5 | 6 | 0 | 2.54 | 0.54 |
|  | send | 28 | 7 | 0 | 0 | 2.17 | 0.31 |
|  | throw | 24 | 6 | 1 | 4 | 2.19 | 0.36 |
|  | write | 25 | 1 | 7 | 2 | 4.09 | 0.39 |

1DO surprisal: -Log2((DO+1)/ (PO+DO+Trans+1)); PO surprisal: -Log2((PO+1)/ (PO+DO+Trans+1))

**Table S2**

*Korean L2 English Verb Biases*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | *PO* | *DO* | *Transitive* | *Other* | *DO surprisal1* | *PO surprisal* |
| *Prime verb* | award | 15 | 1 | 3 | 13 | 3.32 | 0.32 |
|  | bring | 19 | 2 | 8 | 3 | 3.32 | 0.59 |
|  | give | 20 | 4 | 4 | 5 | 2.54 | 0.47 |
|  | pass | 24 | 1 | 6 | 1 | 4.00 | 0.36 |
|  | pay | 16 | 0 | 12 | 5 | 4.86 | 0.77 |
|  | sell | 13 | 0 | 16 | 4 | 4.91 | 1.10 |
|  | send | 28 | 0 | 3 | 2 | 5.00 | 0.14 |
|  | throw | 25 | 1 | 5 | 1 | 4.00 | 0.30 |
|  | write | 17 | 0 | 11 | 5 | 4.86 | 0.69 |

1DO surprisal: -Log2((DO+1)/(PO+DO+Trans+1)); PO surprisal: -Log2((PO+1)/ (PO+DO+Trans+1))

**Table S3**

*Target verb biases in English and Korean speakers*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Bias Group* | *Target Verb* | *PO* | *DO* | *Transitive* | *Other* | *Log((PO+1)/ (DO+1))* | *Log((PO+1)/ (DO+Trans+1))* |
| *English* | hand | 22 | 13 | 0 | 0 | 0.22 | 0.22 |
|  | offer | 21 | 13 | 1 | 0 | 0.20 | 0.17 |
|  | show | 17 | 17 | 0 | 1 | 0.00 | 0.00 |
| *Korean* | hand | 25 | 0 | 7 | 1 | 1.41 | 0.51 |
|  | offer | 22 | 1 | 7 | 1 | 1.06 | 0.41 |
|  | show | 18 | 2 | 10 | 3 | 0.80 | 0.16 |

**Table S4**

*Results from the logistic mixed-effects model on the PO productions, investigating the effects of immediate priming, cumulative adaptation and language group*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| Baseline (Intercept) | -0.13 | 0.21 | -0.64 | .52 |
| Language (in Baseline) | -1.15 | 0.43 | -2.69 | **.01** |
| DO Prime vs. Baseline | -0.28 | 0.20 | -1.42 | .16 |
| PO Prime vs. Baseline | -0.17 | 0.23 | -0.77 | .44 |
| Nr of prior PO (in Baseline) | 0.30 | 0.03 | 9.87 | **.00** |
| Nr of prior DO (in Baseline) | -0.33 | 0.04 | -8.06 | **.00** |
| Language: DO Prime vs. Baseline | 0.01 | 0.39 | 0.02 | .98 |
| Language: PO Prime vs. Baseline | -0.75 | 0.47 | -1.62 | .11 |
| Language: Nr of prior PO | -0.13 | 0.05 | -2.82 | **.00** |
| Language: Nr of prior DO | -0.11 | 0.07 | -1.55 | .12 |
| DO Prime vs. Baseline: Nr of prior PO | -0.07 | 0.03 | -2.40 | **.02** |
| PO Prime vs. Baseline: Nr of prior PO | -0.04 | 0.03 | -1.22 | .22 |
| DO Prime vs. Baseline: Nr of prior DO | 0.04 | 0.04 | 1.12 | .26 |
| PO Prime vs. Baseline: Nr of prior DO | -0.04 | 0.04 | -0.94 | .35 |
| Lang: DO Prime vs. Base: Nr of prior PO | 0.05 | 0.05 | 1.14 | .25 |
| Lang: PO Prime vs. Base: Nr of prior PO | 0.12 | 0.05 | 2.24 | **.03** |
| Lang: DO Prime vs. Base: Nr of prior DO | -0.10 | 0.07 | -1.46 | .14 |
| Lang: PO Prime vs. Base:Nr of prior DO | -0.15 | 0.08 | -1.81 | .07 |

Based on 3142 data points; Loglik = -1373; interactions are indicated with “:”. Random effects include by-subject and by-item intercepts; Prime as a by-subject and by-items random slope, and Number of preceding PO and DO as by-subject random slopes.

**Table S5**

*Results from the logistic mixed-effects model on the PO productions for the Native English participants investigating the effects of Prime Verb Surprisal and Target Verb Bias*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| (Intercept) | -0.53 | 0.26 | -2.06 | 0.04 |
| Prime | 0.37 | 0.21 | 1.81 | 0.07 |
| Prime Verb Surprisal | -0.06 | 0.10 | -0.57 | 0.57 |
| Target Verb Bias | 1.48 | 0.97 | 1.53 | 0.13 |
| Prime: Prime Verb Surprisal | -0.12 | 0.21 | -0.56 | 0.58 |
| Prime: Target Verb Bias | 3.01 | 1.66 | 1.81 | 0.07 |

Based on 1177 data points; Loglik = -623.0. Random effects include by-subject and by-item intercepts; Prime as a by-subject and by-items random slope, and Prime Verb Surprisal and Target Verb Bias as a by-subject random slope.

**Table S6**

*Results from the logistic mixed-effects linear model on the PO productions for the Korean L2 English participants as a function of Korean Verb biases*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| (Intercept) | -0.25 | 0.60 | -0.42 | 0.68 |
| Prime | -1.43 | 1.18 | -1.22 | 0.22 |
| Korean Prime Verb Surprisal | -0.44 | 0.28 | -1.59 | 0.11 |
| Korean Target Verb Bias | 2.51 | 0.90 | 2.78 | **0.01** |
| Prime: Korean Prime Verb Surprisal | -1.02 | 0.59 | -1.74 | 0.08 |
| Prime: Korean Target Verb Bias | 0.79 | 1.38 | 0.58 | 0.56 |

Based on 838 data points; Loglik = -398.0. Random effects include by-subject and by-item intercepts; Prime as a by-subject and by-items random slope, and Korean Prime Verb Surprisal and Korean Target Verb Bias as a by-subject random slope.

**Table S7**

*Analysis on PO and DO responses only.**Results from the logistic mixed-effects model on the PO productions (relative to DO productions), investigating the effects of immediate priming, cumulative adaptation and language group.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| Baseline (Intercept) | 0.79 | 0.22 | 3.61 | **0.00** |
| Language | 0.66 | 0.52 | 1.27 | 0.20 |
| DO Prime vs. Baseline | -0.17 | 0.20 | -0.87 | 0.38 |
| PO Prime vs. Baseline | -0.20 | 0.22 | -0.90 | 0.37 |
| Nr of prior PO (in Baseline) | 0.33 | 0.04 | 7.68 | **0.00** |
| Nr of prior DO (in Baseline) | -0.35 | 0.04 | -8.10 | **0.00** |
| Language:DO Prime vs. Baseline | -0.16 | 0.63 | -0.26 | 0.80 |
| Language:PO Prime vs. Baseline | -1.15 | 0.68 | -1.68 | 0.09 |
| Language:Nr of prior PO | -0.08 | 0.07 | -1.23 | 0.22 |
| Language:Nr of prior DO | -0.25 | 0.08 | -3.01 | **0.00** |
| DO Prime vs. Base:Nr of prior PO | -0.02 | 0.04 | -0.55 | 0.58 |
| PO Prime vs. Base:Nr of prior PO | -0.03 | 0.05 | -0.76 | 0.45 |
| DO Prime vs. Baseline:Nr of prior DO | 0.03 | 0.05 | 0.56 | 0.58 |
| PO Prime vs. Baseline:Nr of prior DO | -0.03 | 0.05 | -0.57 | 0.57 |
| Lang: DO Prime vs. Base:Nr of prior PO | 0.12 | 0.08 | 1.53 | 0.13 |
| Lang: PO Prime vs. Base:Nr of prior PO | 0.11 | 0.08 | 1.34 | 0.18 |
| Lang: DO Prime vs. Base:Nr of prior DO | -0.08 | 0.09 | -0.88 | 0.38 |
| Lang: PO Prime vs. Base:Nr of prior DO | -0.12 | 0.11 | -1.04 | 0.30 |

Based on 2572 data points; Loglik = -927.8. Random effects include by-subject and by-item random intercepts by-subject random slopes for Prime condition, Number of preceding PO, and Number of preceding DO.

**Table S8**

*Results from the logistic mixed-effects model on the PO productions (vs. DO productions) for the Native English participants.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| Baseline (Intercept) | -0.41 | 0.17 | -2.48 | **0.01** |
| DO Prime vs. Baseline | -0.02 | 0.16 | -0.15 | 0.88 |
| PO Prime vs. Baseline | 0.31 | 0.17 | 1.87 | 0.06 |
| Nr of prior PO | 0.24 | 0.03 | 9.15 | **0.00** |
| Nr of prior DO | -0.19 | 0.02 | -7.93 | **0.00** |
| DO Prime vs. Baseline:Nr of prior PO | -0.09 | 0.03 | -2.97 | **0.00** |
| PO Prime vs. Baseline:Nr of prior PO | -0.08 | 0.03 | -2.37 | **0.02** |
| DO Prime vs. Baseline:Nr of prior DO | 0.08 | 0.03 | 3.05 | **0.00** |
| PO Prime vs. Baseline:Nr of prior DO | 0.03 | 0.03 | 1.24 | 0.22 |

Based on 1738 data points; Loglik = -816.8. Random effects include by-subject and by-item random intercepts, and by-subject random slopes for Prime condition.

**Table S9**

*Results from the logistic mixed-effects model on the PO productions (vs. DO productions) for the Korean L2 English participants.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| Baseline (Intercept) | 5.53 | 1.11 | 4.98 | **0.00** |
| DO Prime vs. Baseline | -0.03 | 0.96 | -0.03 | 0.98 |
| PO Prime vs. Baseline | 0.08 | 1.15 | 0.07 | 0.94 |
| Nr of prior PO (in Baseline) | 0.27 | 0.14 | 1.98 | **0.05** |
| Nr of prior DO (in Baseline) | -0.68 | 0.19 | -3.52 | **0.00** |
| DO Prime vs. Baseline:Nr of prior PO | 0.15 | 0.10 | 1.55 | 0.12 |
| PO Prime vs. Baseline:Nr of prior PO | 0.15 | 0.12 | 1.29 | 0.20 |
| DO Prime vs. Baseline:Nr of prior DO | -0.10 | 0.11 | -0.90 | 0.37 |
| PO Prime vs. Baseline:Nr of prior DO | -0.22 | 0.15 | -1.48 | 0.14 |

Based on 834 data points; Loglik = -144.9. Random effects include by-subject and by-item random intercepts, by-subject random slopes for Prime condition, Number of preceding PO and DO.

**Table S10**

*Results from the logistic mixed-effects model on the PO productions (vs. DO productions) as a function of Prime Verb Surprisal and Target Verb Bias for all participants.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| (Intercept) | 0.91 | 0.26 | 3.51 | 0.00 |
| Language | 4.21 | 0.61 | 6.91 | **0.00** |
| Prime | 0.15 | 0.23 | 0.67 | 0.50 |
| Prime Verb Surprisal | -0.21 | 0.12 | -1.77 | 0.08 |
| Target Verb Bias | 2.49 | 1.01 | 2.46 | **0.01** |
| Language: Prime | -0.66 | 0.66 | -1.00 | 0.32 |
| Language: Prime Verb Surprisal | -0.41 | 0.35 | -1.19 | 0.23 |
| Language: Target Verb Bias | 3.43 | 2.89 | 1.19 | 0.24 |
| Prime: Prime Verb Surprisal | -0.28 | 0.23 | -1.24 | 0.21 |
| Prime: Target Verb Bias | 0.71 | 1.64 | 0.44 | 0.66 |
| Language: Prime: Prime Verb Surprisal | -0.53 | 0.56 | -0.94 | 0.35 |
| Language: Prime: Target Verb Bias | -7.26 | 4.11 | -1.77 | 0.08 |

Based on 1653 observations; Loglik = -724.9. Random effects included a by-subject and by-item intercept, by-subject random slopes for Prime, Prime Verb Surprisal and Target Verb Bias, and a by-item random slope for Prime.

**Table S11**

*Results from the logistic mixed-effects model on the PO productions for the Native English participants, based on PO and DO responses only, as a function of Prime Verb Surprisal and Target Verb Bias.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| (Intercept) | -0.42 | 0.26 | -1.64 | 0.10 |
| Prime | 0.35 | 0.21 | 1.65 | 0.10 |
| Prime Verb Surprisal | -0.08 | 0.11 | -0.75 | 0.45 |
| Target Verb Bias | 1.76 | 0.94 | 1.87 | 0.06 |
| Prime: Prime Verb Surprisal | -0.15 | 0.24 | -0.61 | 0.54 |
| Prime: Target Verb Bias | 3.02 | 1.68 | 1.80 | 0.07 |

Based on 1126 data points; Loglik = -603.8. Random effects included a by-subject and by-item intercept, by-subject and by-item random slope for Prime, and by-subject random slopes for the interaction of Prime and Prime Verb Surprisal, and the interaction of Prime by Target Verb Bias.

**Table S12**

*Analysis on PO and DO responses only: Effects of Prime Verb Surprisal and Target Verb Bias, Korean participants only, using verb biases obtained from Korean learners of English*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Fixed Effect* | β | *SE* | *z-value* | *p-value* |
| (Intercept) | -1.10 | 5.91 | -0.19 | 0.85 |
| Prime | -16.31 | 11.88 | -1.37 | 0.17 |
| Prime Verb Surprisal | -4.89 | 3.34 | -1.46 | 0.14 |
| Target Verb Bias | 6.55 | 4.22 | 1.55 | 0.12 |
| Prime: Prime Verb Surprisal | -9.60 | 6.92 | -1.39 | 0.17 |
| Prime: Target Verb Bias | -0.83 | 2.62 | -0.32 | 0.75 |

Based on 527 data points; Loglik =-113.3. Random effects included a by-subject and by-item intercept, by-subject random slopes for Prime, Prime Verb Surprisal and Target Verb Bias, and a by-item random slope for Prime.